In re Patent Application of:
**SALINA ET AL.**
Serial No. **10/672,925**
Filing Date: **SEPTEMBER 26, 2003**

## REMARKS

The Examiner is thanked for the thorough examination of the present application. In view of the arguments presented in detail below, it is submitted that all of the claims are patentable.

## I. The Claimed Invention

The present invention is directed to a disk drive. As recited in independent Claim 1, for example, the disk drive includes a housing, a rotatable data storage disk and associated disk drive motor carried by the housing for rotating the rotatable data storage disk, and a movable arm and associated arm drive motor carried by the housing for moving the arm adjacent to the rotatable data storage disk. The disk drive further includes at least one read/write head carried by the arm, at least one capacitor connected to a power supply, and a driving circuit for the arm drive motor. The driving circuit includes at least one output stage connected to the power supply for driving the arm drive motor, and an auxiliary pulse width modulation (PWM) control circuit connected to the at least one capacitor for driving the at least one output stage in a PWM mode after the power supply is switched off using charge stored in the at least one capacitor.

Independent Claim 10 is directed to a related electronic device, independent Claim 20 is directed to a related driving circuit, and independent Claim 25 is directed to a related method. Each of the claims recites driving at least one

output stage in a PWM mode after the power supply is switched off using charge stored in at least one capacitor, similar to Claim 1.

**II. The Claims Are Patentable**

The Examiner rejected independent Claims 1, 10, 20 and 25 based upon U.S. published application no. 2003/0227707 to Kokami et al. This reference is directed to a magnetic disk memory device in which the shifting speed of the magnetic head during a power supply interruption is detected, and a voice coil motor (VCM) is controlled in accordance with the detected shifting speed to enable the head to be shunted safely and promptly.

The Examiner points to FIG. 2 and paragraphs 32-34 of Kokami et al. for his contention that this reference teaches a driving circuit as recited in the above-noted independent claims. In particular, the Examiner points to the booster circuit 140 which includes a charge pump for boosting a source voltage Vcc and an oscillator for generating an operating clock signal for the booster circuit. The Examiner contends that the oscillator provides an auxiliary PWM control circuit as recited in the above-noted independent claims, and he also notes that the booster circuit is connected to capacitors C1 and C2. See Office Action, pages 2 and 3.

It is respectfully submitted that the Examiner mischaracterizes Kokami et al. In particular, the energy for powering the retract action of the VCM of Kokami et al. is

derived from the capacitor **C1**. Rather, this energy is provided by the back electromotive force (BEMF) that is generated by the spindle motor, which upon an interruption of the power supply behaves as a current generator (BEMF) connected to the Vcc line. See, e.g., paragraphs 0004 and 0032 of Kokami et al. As noted in paragraph 0033:

> "[a] boosted voltage Vbst provided by the booster circuit **140** is accumulated in a smoothing capacitor **C1**. The accumulated boosted voltage Vbst, as it is supplied in time of a power failure as the source voltage to the coil drive amplifiers **121** and **122** which control the gate voltages of the power MOSFETs **M7**, **M8**, **M9** and **M10** which makes currents flow to the coil of the voice coil motor **340**." (Emphasis added).

Therefore, the capacitor **C1** is not the source of energy that drives the VCM to carry out a retract operation when a power interruption to the integrated circuit occurs.

Kokami et al. is silent as to the function of the capacitor **C2**. However, this capacitor has its input and output connected to the booster circuit **140**, and the only output of the booster circuit is for supplying the Vbst voltage to the capacitor **C1**. Thus, during a power interruption, the capacitor **C2** also does not supply power for driving the VCM. Again, it is the BEMF generated by the spindle motor that does so.

As can be verified by the circuit diagram of FIG. 2 of Kokami et al., the capacitor **C1** supplies the control circuits **111** and **130** that generate the control signals and the driver stages

112 and 121 and not the output power stages M1-M4, M7-M8 for the VCM. The output power stages M7-M8 and M9-M10 that drive the VCM "switch" the VCM control nodes P1 and P2 between the Vcc line and ground, both during normal operation as well as during power failure. During power failures, the Vcc line is supplied with the BEMF generated by the spindle motor 310 while being braked to its eventual halt following the power interruption.

As such, Kokami et al. fails to teach all of the recitations of the above-noted independent claims. Since the remaining prior art of record fails to teach or fairly suggest the noted deficiencies, independent Claims 1, 10, 20 and 25 are patentable over the prior art. Their respective dependent claims, which recite yet further distinguishing features, are also patentable over the prior art and require no further discussion herein.

## CONCLUSIONS

In view of foregoing, it is submitted that all of the claims are patentable. Accordingly, a Notice of Allowance is respectfully requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

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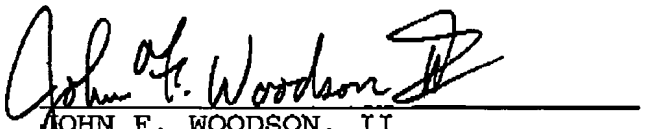
Respectfully submitted,



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**CERTIFICATE OF FACSIMILE TRANSMISSION**

I HEREBY CERTIFY that the foregoing correspondence has been forwarded via facsimile number 571-273-8300 to the Commissioner of Patents on this 23 day of August, 2005.